

REMARKS

The Official Action dated October 17, 2005, has been carefully considered. Applicants appreciate the Examiner's thorough review of the application. Consideration of the changes and remarks presented herein and reconsideration of the objections and rejections are respectfully requested.

By present amendment, claims 1, 26 and 30 have been amended herein. Support for the amendments can be found in the specification, claims and drawing as originally filed, for example in the specification at page 1, lines 14-16 to page 2, lines 1-5. For example, claims 1 and 30 were amended to include that dried post combustion material recycled from a drop out box of an electric arc furnace has less than about 6.7% by weight of zinc oxide. The support for these amendments can be found in the specification which discloses that the post combustion material from the drop out box has an iron content from about 20% to about 75% by weight; from about 15% to about 25% by weight moisture; about 20% by weight of material similar in content to slag foaming material which includes calcium and magnesium oxides, iron, carbon and/or manganese; and up to about 5% by weight of other metals or oxides. A dried post combustion material having no moisture will therefore contain the largest possible percentage of "other metals or oxides," which would potentially include zinc oxide, of about 6.7% by weight [(5% other metals or oxides) / (75% total solids)].

It is believed that these changes do not involve any introduction of new matter, whereby entry is believed to be in order and is respectfully requested. Accordingly, claims 1-2, 4-7, 26 and 30 remain in this application and, as set forth below, are believed to be in condition for allowance.

In the Official Action, the Examiner rejects claims 1-2, 4-7 and 30 under 35 U.S.C. § 112, first paragraph, arguing that they fail to comply with the written description requirement.

In light of the amendments made to the claims, Applicants traverse this rejection on the basis that the percentage limitation for the slag foaming material has been removed. As such, Applicants believe this rejection has been overcome and respectfully request reconsideration.

In the Official Action, the Examiner rejects claims 1, 5, 6 and 30 under 35 U.S.C. § 103(a) as being unpatentable over Fudala (U.S. Patent No. 5,493,580). The Examiner asserts that Fudala discloses a method for recycling electric arc furnace dust collected during production of steel. Moreover, the Examiner asserts that Fudala discloses that the dust is collected in "dust filtering devices" which would include materials collected in a gravity type filtering device such as a "drop out box." In addition, the Examiner contends that the recycled electric arc furnace dust and coal are injected into an electric arc furnace at the interface between the slag and the molten metal bath.

The Examiner notes that Fudala does not expressly disclose that the dried post combustion material is between 5% and 30% of the injected material or that the slag foaming material is between 70% and 95%. The Examiner also asserts that Fudala discloses that the composition of filter dust in the filter dust/carbon mixture is no more than 70% filter dust, thus suggesting that it would have been obvious to one skilled in the art to use a composition of between 5% and 30% filter dust in the dust/carbon mixture of Fudala because Fudala discloses that the entire range from between 0% and 70% is beneficial for foaming the slag. Moreover, the Examiner contends that it would have been obvious to one skilled in the art to use between 70% and 95% coal in the filter dust/coal mixture of Fudala because Fudala discloses that the entire range from between 30% and 100% is beneficial for foaming the slag. Finally, the Examiner asserts that Fudala discloses that in typical operations between 3 and 30 kg of filter dust are produced per ton of steel and that the amount of filter dust injected back into the furnace in Fudala for recovery is limited to 24 kg/ton of steel produced.

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As will be set forth in detail below, it is submitted that the steel processing materials of claims 1, 5, 6 and 30 are non-obvious and patentably distinguishable from the teachings of Fudala. Accordingly this rejection is traversed and reconsideration is respectfully requested.

Fudala discloses a process for recycling the filter dust obtained during the production of steel in an electric arc furnace (abstract). Moreover, Fudala discusses that in order for the filter dust to be used for recycling it must have a proportion of zinc oxides which exceeds 25% (col. 1, lines 28-33).

The invention as defined by claim 1, from which claims 2 and 4-7 depend, is directed towards a steel processing material for addition into a heat of steel in an electric arc furnace including from about 5% to about 30% of a dried post combustion material recycled from the drop out box of an electric arc furnace and a slag foaming material. The dried post combustion material has less than about 6.7% by weight of zinc oxide.

Claim 30 is directed toward a steel processing material for addition into a heat of steel in an electric arc furnace having from about 5% to about 30% of a dried post combustion material recycled from the drop out box of an electric arc furnace and a slag foaming material. The dried post combustion material has less than about 6.7% by weight of zinc oxide. The recovery of iron from the steel processing material is only a portion of the iron in the heat.

In order for references to be relied upon to support a rejection under 35 U.S.C. § 103 they must provide an enabling disclosure, i.e., they must place the claimed invention in the possession of the public. *Glaxo Inc. v. Novopharm Ltd.*, 34 U.S.P.Q.2d, 1565 (Fed. Cir. 1995); *In re Payne*, 203 U.S.P.Q. 245 (CCPA 1979). Applicants find no teaching or suggestion by Fudala of a steel processing material as set forth by independent claims 1 or 30. For example, Fudala fails to teach or suggest a steel processing material having from

about 5% to about 30% of a dried post combustion material recycled from the drop out box of an electric arc furnace, wherein the dried post combustion material has less than about 6.7% by weight of zinc oxide. Rather, Fudala discloses recycling filter dust having zinc oxide proportions in an amount which exceeds 25% (col. 1, lines 28-33). Not only does Fudala teach recycling filter dust (which Applicants describe as "bag house dust"), but the filter dust must contain at least 25% zinc oxide, an amount significantly above that as recited in present independent claims 1 and 30. Thus, one skilled in the art would have no motivation to modify the teachings of Fudala to result in the present invention. Moreover, the dried post combustion material is not the "filter dust" as taught in Fudala, but is material recycled from the drop out box of the electric arc furnace. As such, Fudala fails to teach or suggest the presently claimed steel processing materials as set forth in claims 1, 5, 6 and 30.

It is therefore submitted, that the presently claimed steel processing materials as defined by claims 1, 5, 6 and 30 are non-obvious over and patentably distinguishable from Fudala whereby the rejection under 35 U.S.C. §103 has been overcome. Reconsideration is respectfully requested.

In the Official Action, the Examiner rejects claim 2 under 35 U.S.C. § 103(a) as being unpatentable over Fudala in view of Lankford, Jr. et al (The Making, Shaping and Treating of Steel, 1985). The Examiner notes that Fudala is silent regarding the addition of dolomitic stone as described in claim 2. The Examiner contends that Lankford, Jr. et al teach that for the removal of acidic impurities, such as sulfur, a basic slag consisting of either dolomite or limestone may be used. Thus, the Examiner notes that it would have been obvious to one skilled in the art to use dolomite or limestone as a flux in the process of Fudala to remove acidic impurities as taught by Lankford, Jr. et al.

As will be set forth in detail below, it is submitted that the steel processing materials

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of claim 2 are non-obvious and patentably distinguishable from the teachings of Fudala in view of Lankford, Jr. et al. Accordingly this rejection is traversed and reconsideration is respectfully requested.

Once again, in order for references to be relied upon to support a rejection under 35 U.S.C. § 103 they must provide an enabling disclosure, i.e., they must place the claimed invention in the possession of the public. Claim 2 depends from independent claim 1, and as such, Applicants believe that Fudala does not render claim 2 obvious. Moreover, the deficiencies of Fudala are not overcome by the teachings of Lankford, Jr. et al. Lankford, Jr. et al generally discusses fluxes in the iron and steel making process, and does not teach or suggest recycling of post combustion material. Lankford, Jr. et al do not teach or suggest a steel processing material having from about 5% to about 30% of a dried post combustion material recycled from the drop out box of an electric arc furnace, wherein the dried post combustion material has less than about 6.7% by weight of zinc oxide. As such, Applicants therefore submit that the 35 U.S.C. § 103 rejection of claim 2 over Fudala in view of Lankford, Jr. et al has been overcome. Reconsideration is respectfully requested.

In the Official Action, the Examiner rejects claims 4 and 26 under 35 U.S.C. § 103(a) as being unpatentable over Fudala in view of Ford, Jr. et al (U.S. Patent No. 5,738,694). The Examiner notes that Fudala fails to disclose that the dried post combustion material has less than about 2% water. The Examiner contends that Ford, Jr. et al disclose a method for agglomerating electric arc furnace dust with a dolomite lime binder and coal prior to use in a steel making process. The Examiner notes that it would have been obvious to one skilled in the art to agglomerate the electric arc furnace dust and coal fines of Fudala with a binder as taught by Ford, Jr. et al prior to injection in the electric arc furnace of Fudala to prevent the entrainment of coal fines as dust in waste gas as taught by Ford, Jr. et al.

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As will be set forth in detail below, it is submitted that the steel processing materials of claims 4 and 26 are non-obvious and patentably distinguishable from the teachings of Fudala in view of Ford, Jr. et al. Accordingly this rejection is traversed and reconsideration is respectfully requested.

The invention, as defined by claim 26 is directed towards a steel processing material, at least partially recycled from an electric arc furnace, including a post combustion material having less than 2% moisture by weight and recycled from the drop out box of an electric arc furnace and a slag foaming material. The steel processing material is operable to contribute to the foaming of slag when added to a heat of steel in an electric arc furnace and to react with the heat to recover iron from the post combustion material to the heat, further wherein less than about 1% by weight of the total iron in the heat being recovered is iron. The dried post combustion material has less than about 6.7% by weight of zinc oxide.

As noted above, Applicants do not believe that Fudala renders claim 1 obvious, from which claim 4 depends, and as such, Applicants believe that Fudala also does not render claim 4 obvious. For similar reasons as noted above for independent claims 1 and 30, Applicants do not believe Fudala renders claim 26 obvious. The deficiencies of Fudala are not overcome by the teachings of Ford, Jr. et al. Ford, Jr. et al teach combining furnace dust with an organic binder into discrete shapes which can then be used in iron and steel making processes (abstract). Ford, Jr. et al do not teach or suggest a steel processing material having a post combustion material recycled from the drop out box of an electric arc furnace, wherein the post combustion material has less than about 6.7% by weight of zinc oxide, as required by claims 4 and 26. As such, Applicants therefore submit that the 35 U.S.C. § 103 rejection of claims 4 and 26 over Fudala in view of Ford, Jr., et al has been overcome. Reconsideration is respectfully requested.

In the Official Action, the Examiner rejects claim 5 under 35 U.S.C. § 103(a) as being unpatentable over Fudala in view of Steger et al ("Waste Gas Purification and Waste Free Plant Concept for EAF", 1999). The Examiner notes that Fudala is silent with respect to the iron content of the electric arc furnace dust and does not disclose that the post combustion material includes about 30% to about 55% Fe. The Examiner contends that Steger et al disclose that it is an inherent property of the electric arc furnace dusts that the composition of iron is between 8 and 35%, thus the Examiner asserts that because Fudala discusses electric arc furnaces, the dusts in Fudala would have an inherent iron composition of between 8 and 35%, which overlaps with the range of about 30% to about 55% Fe.

As will be set forth in detail below, it is submitted that the steel processing materials of claim 5 are non-obvious and patentably distinguishable from the teachings of Fudala in view of Steger et al. Accordingly this rejection is traversed and reconsideration is respectfully requested.

Again, in order for references to be relied upon to support a rejection under 35 U.S.C. § 103 they must provide an enabling disclosure, i.e., they must place the claimed invention in the possession of the public. Claim 5 depends from independent claim 1, and as such, Applicants believe that Fudala does not render claim 5 obvious. Moreover, the deficiencies of Fudala are not overcome by the teachings of Steger et al. Steger et al generally provides an introduction to the waste free plant concept based on the recycling of ferrous components and the recovery of valuable by-products from the residuals and dusts of an electric arc furnace (see abstract). However, Steger et al do not teach or suggest a steel processing material having from about 5% to about 30% of a dried post combustion material recycled from the drop out box of an electric arc furnace, wherein the dried post combustion material has less than about 6.7% by weight of zinc oxide. As such, Applicants therefore submit that

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the 35 U.S.C. § 103 rejection of claim 5 over Fudala in view of Steger et al has been overcome. Reconsideration is respectfully requested.

It is believed that the above represents a complete response to the Examiner's objections and rejections under 35 U.S.C. §§ 103 and 112, first paragraph, and places the present application in condition for allowance. Reconsideration and an early allowance are respectfully requested.

Respectfully submitted,

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